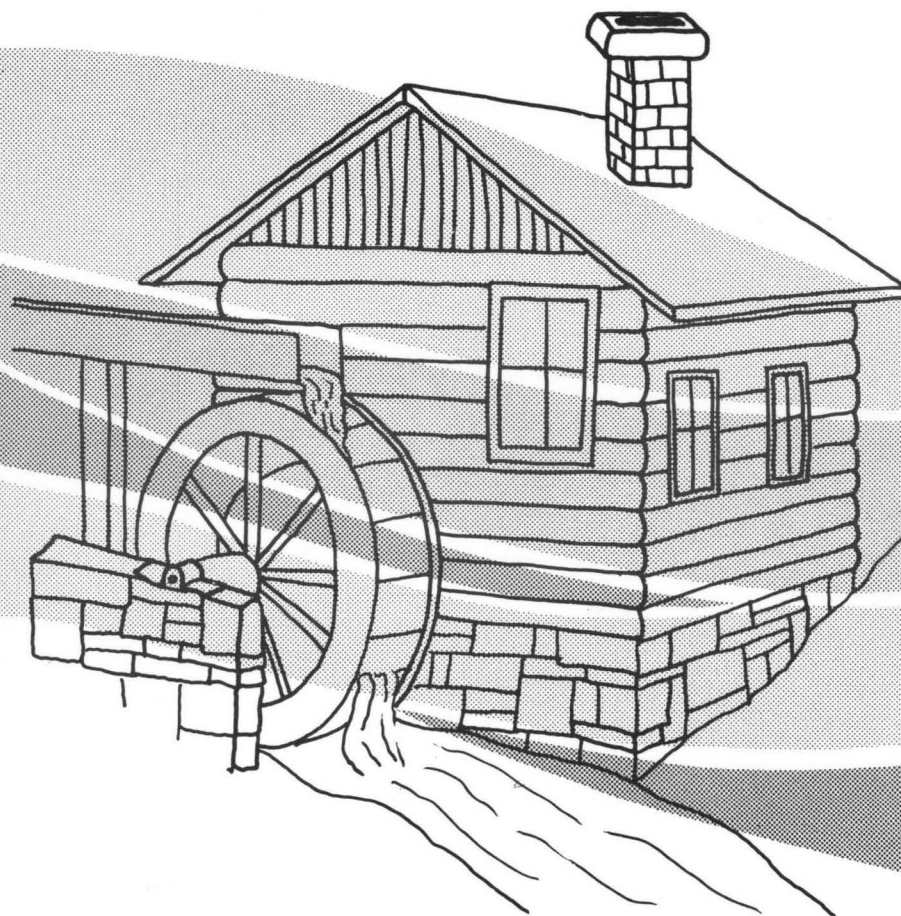


MICRO - HYDRO

A BIBLIOGRAPHY



By
Beth Moore

UNDER THE DIRECTION OF
JOHN S. GLADWELL

MAY 1979

\$1.50

MICRO-HYDRO

Interest in energy self-sufficiency continues to grow. In particular we at the Institute have noticed an increasing awareness of and curiosity about the practicality of very small (micro-hydro) hydroelectric developments.

A great deal has been written about the subject of micro-hydro. But when questions began to be asked of us, we found that there did not exist a comprehensive bibliography that we could offer. To help solve that problem and fill the void we decided to prepare this publication.

We harbor no belief that this bibliography is complete. Thus we will want to update the publication in time. We therefore, request that anyone who has references that he/she feels should be included, share them with us.

In the meantime, we hope this bibliography assists those interested in micro-hydro. If the Institute can be of further assistance, please let us know.

John S. Gladwell
Director



Idaho Water Resources Research Institute
University of Idaho
Moscow, Idaho 83843

c1979

I. RELATED TEXTS

ALTERNATIVE NATURAL ENERGY SOURCES

Davis, A.J. and Schubert, R.P., (Van Nostrand Reinhold Co.), 1974, pp. 87-97.

A selected chapter in the book discusses assessing stream potential, dam type and location, the water wheel and hydraulic ram.

Van Nostrand Reinhold Co. \$6.95
Div. of Litton Ed. Publ., Inc.
135 W. 50th St.
New York, NY 10020

APPROPRIATE TECHNOLOGY SOURCEBOOK

Darrow, K. and Pam, R., (VITA), 1976, pp. 154-163.

A practical book that deals with water technology for village and small community use.

VITA \$4.00
3706 Rhode Island Ave.
Mt. Rainier, MD 20822

BRITISH WATERMILLS

Syson, L., (B.T. Batsford), 1965, 176 pp.

B.T. Batsford Ltd.
4 Fitzhardinge St.
London W1H 0AH
England

CLOUDBURST 2

Marks, V. (ed), (Cloudburst Press), 1976, 128 pp.

This book is very similar to its first counterpart, Cloudburst 1, and contains 3 articles on hydraulic rams.

Cloudburst Press \$4.95
Dept. C-2
Mayne Island, B.C.
VON 2 J0
Canada

CLOUDBURST - A HANDBOOK OF RURAL SKILLS AND TECHNOLOGY

Marks, V. (ed), (Cloudburst Press), 1977, 128 pp.

A handbook that focuses on rural survival skills including the building of dams and water wheels.

Cloudburst Press \$4.95
Dept. C-1 Add \$.25 for handling
Mayne Island, B.C. charges
VON 2 J0, Canada

DESIGN OF SMALL DAMS

Dept. of the Interior, (Government Printing Office), 1973, 816 pp.

A civil engineering type text that discusses the design and construction of earth fill dams ranging in size from medium to large.

Superintendent of Documents \$12.65
U.S. Government Printing Office
Washington, D.C. 20402

DISCOVERING WATERMILLS

Vince, J.N.T., (Shire Publications), 1970, 56pp.

Shire Publications, Ltd.
Cromwell House
Church St.
Princes Risborough
Aylesbury, Bucks, HPJ7 9AJ
England

EARTH, WIND, SUN AND WATER: THE ENERGY ALTERNATIVES

Thekaekara, M.P. (ed), (Publisher Unknown), _____, 103 pp.

Institute of Environmental Sciences \$8.00
Mt. Prospect, IL 60056

ENCYCLOPEDIA OF ENERGY

Lapedes, D.N. (ed), (McGraw-Hill, Inc.), 1976, 785 pp.

An excellent source book of energy information--an energy dictionary

McGraw Hill
New York, NY 10016

ENERGY BOOK #1: NATURAL SOURCES AND BACKYARD APPLICATIONS

Prennis, J. (ed), (Running Press), 1975, _____pp.

Running Press \$4.00
38 S. 19th St.
Philadelphia, PA 19103

ENERGY BOOK #2: MORE NATURAL SOURCES AND BACKYARD APPLICATIONS

Prennis, J. (ed), (Running Press), 1977, _____pp.

Running Press \$9.80
38 S. 19th St.
Philadelphia, PA 19103

ENERGY, ENVIRONMENT AND BUILDING

Steadman, P., (Cambridge University Press), 1975, pp. 213-220.

In Chapter 12, Steadman includes a list of small hydraulic turbine manufacturers and a small scale water power bibliography.

Cambridge University Press \$16.95
New York, NY 10016

ENERGY FOR RURAL DEVELOPMENT: RENEWABLE RESOURCES AND ALTERNATIVE TECHNOLOGIES FOR DEVELOPING COUNTRIES

National Academy of Science, (N.A.S.), 1976, 301 pp.

A report issued to summarize the status of alternative energy systems tested or manufactured. Applications of hydro power are presented.

Commission on International Relations Free
(JH 215)
National Academy of Sciences
2101 Constitution Ave., N.W.
Washington, D.C. 20418

ENERGY FOR SURVIVAL, THE ALTERNATIVE TO EXTINCTION

Clark, W., (Doubleday), 1974, pp. 330-340.

This text introduces some very general philosophies and ideas concerning water power development in relation to current alternatives.

Doubleday \$4.95
Garden City
New York, NY 11530

ENERGY PRIMER

Merrill, R. and Gage, T. (eds.), (Portola Institute), 1974, pp. 100-119.

Saunders outlines a methodology for assessing stream potential and harnessing it by a variety of systems from dams and water wheels to sluices and turbines. An excellent review of water power related literature follows.

Whole Earth Truck Store \$5.50
558 Santa Cruz Ave.
Menlo Park, CA 94025

HANDBOOK OF APPLIED HYDRAULICS

Davis, C.V., (McGraw-Hill), 1952, _____pp.

An excellent text that covers all facets of applied hydraulics and focuses in on hydro power application.

McGraw-Hill \$23.50
New York, NY 10016

HARNESSING WATER POWER FOR HOME ENERGY

McGuigan, D., (Garden Way Publishing Co.), 1978, 101 pp.

This book covers all sizes, shapes and types of small scale hydro units from their mechanism to installation and operation.

Garden Way Publ. Co. \$4.95
Charlotte, VT 05545

HANDBOOK OF HOMEMADE POWER

Mother Earth News, (Bantam Books), 1974, 367 pp.

This publication contains C.D. Bassett's five-part article on hydro power originally printed in Popular Science, 1947. In addition, it contains plans for a water wheel.

Mother Earth News \$2.20
PO Box 70
Hendersonville, NC 28739

HOME ENERGY HOW-TO

Hand, A.J., (Harper and Row), 1977, pp. 222-239.

Chapter 11 discusses various hydro-electric systems and presents a good general reference list.

Whole Earth Truck Store \$9.95
558 Santa Cruz Ave.
Menlo Park, CA 94025

HYDRO POWER

Conservation Tools and Technology, (Conservation Tools and Technology), _____, 72 pp.

A general text intended to develop the use of micro-hydro systems in England.

Conservation Tools and Technology \$3.40
143 Maple Road
Surbiton
Surrey KT6, 4BH
England

HYDRO POWER

McKillop, A., (Wadebridge Ecological Centre), _____, 74pp.

This book contains a number of reprints of useful designs by C.D. Bassett and lightly considers legal problems encountered with developing a dam and hydro system.

Wadebridge Ecological Centre £1.50
Molesworth Street
Wadesbridge, Cornwall
England

HYDRO ELECTRIC ENGINEERING PRACTICE

Brown, J.G. (ed), (Gordon and Breach), 1958, 3 volumes.

These volumes are intended as a technical reference source for civil engineers.

Gordon and Breach Vol. 1 \$50.00
New York, NY 10016 Vol. 2 \$30.00
 Vol. 3 \$25.00

HYDRO ELECTRIC HANDBOOK

Craeger, W.P. and Justin, J.D., (John Wiley and Son), 1950, _____pp.

An excellent reference book covering the subject quite thoroughly.

John Wiley and Son \$18.50
New York, NY 10016

HYDRO POWER ENGINEERING

Doland, J.J., (Roland Press Co.), 1954, _____pp.

A general text for civil engineers.

Roland Press Co.
New York, NY 10016

IT'S IN YOUR POWER

Diamond, S. and Lorris, P.S., (Rawson Associates Publishers, Inc.), 1978, pp. 105-119.

Chapter 6 entitled "Earth and Water" presents a discussion of general information pertaining to the field.

Rawson Associates Publishers, Inc.
New York, NY 10017

LIVING WITH ENERGY

Alves, R., (Penguin Books), 1978, _____pp.

This text contains an excellent bibliography section listing professionals, institutions, designers and agencies involved in the water power field.

Penguin Books \$14.95
625 Madison Ave.
New York, NY 10022

NATURAL SOURCES OF POWER

Ball, R.S. (Constable and Co., Ltd.), 1908, _____pp.

A text that deals specifically with wind and water power.

Constable and Co., Ltd. Price subject to
10 Orange St. change
London WC2H 7EG
England

NEW LOW-COST SOURCES OF ENERGY FOR THE HOME

Clegg, P., (Garden Way Publishing), 1975, 250 pp.

Garden Way Publishing Co. Paperback \$6.95
Dept. EE Hardback \$9.95
Charlotte, VT 05445

THE NEW UNESCO SOURCE BOOK FOR SCIENCE TECHNOLOGY

UNESCO, (UNESCO), 1973, 254 pp.

A book for science teachers that supplies information on how to construct a model hydraulic ram and water wheel--just for practice.

UNIPUB Inc. \$12.00
PO Box 433
Murray Hill Station
New York, NY 10016

OTHER HOMES AND GARBAGE

Leckie, J., Masters, G., Whitehouse, H., Young, L., (Sierra), 1975, 300 pp.

The chapter that is oriented toward water supply discusses solar distillation of water, water wells, pumps and water purification.

Whole Earth Truck Store \$9.95
558 Santa Cruz Ave.
Menlo Park, CA 94025

POWER FROM WATER

Paton, T.A.L., (Leonard Hill (Books) Limited), 1961, 210 pp.

An outline of developments in water power from small scale to large hydro-electric plants of the present.

Leonard Hill (Books) Limited \$8.50
Eden Street
London, N.W.1
England

POWER PLANTS

Zerban, A.H., and Nye E.P. (International Textbook Co.), 1952, ___pp.

Chapter 12 of this text discusses hydraulic power plants.

International Textbook Co., Ltd. Price subject to change
450 Edgware Rd.
London W2 1EG
England

PRACTICAL WATER POWER ENGINEERING

Taylor, W.T., (Van Nostrand), 1925, _____pp.

A practical text that explains how to assess energy potential from small streams, discusses power unit site selection, and storage options (reservoir and canal) for small to medium sized undertakings.

Van Nostrand Reinhold Co.
135 W. 50th St.
New York, NY 10020

PRODUCING YOUR OWN POWER

Stoner, C.H. (ed), (Rodale Press, Inc.), 1975, pp. 61-102.

One chapter in the book dealing with small water power is essentially a reprint of "Low Cost Development of Small Water Power Sites"-- a VITA booklet.

Whole Earth Truck Store \$3.95
558 Santa Cruz Ave.
Menlo Park, CA 94025

RADICAL TECHNOLOGY

Boyle, G. and Harper, P. (eds.), (Pantheon Books), 1976, pp. 89-91.

A very general text that presents some interesting ideas concerning hydro power application on the pages noted above.

Pantheon Books \$5.95
Div. of Random House, Inc.
201 E. 50th St.
New York, NY 10022

SMALL SCALE POWER GENERATION

United Nations, (United Nations), 1967, _____pp.

A discussion of water and wind power alternatives.

United Nations
New York, NY 10017

SMALL SCALE POWER SOURCES

Doyle, R. and Fraenkel, P., (Intermediate Technology Publications), _____, _____pp.

Intermediate Technology - \$18.00
Publications, Ltd.
9 King St.
London WC2E 8HN
England

SOFT-TECH

Baldwin, J. and Brand, S. (eds.), (Penguin Books), 1958, 175 pp.

An excellent resource book that includes information on how-to-construct and where-to-locate parts for a selected assortment of projects.

Penguin Books \$5.00
625 Madison Ave.
New York, NY 10022

SURVIVAL SCRAPBOOK #3: ENERGY

Szcelkun, (Schoken Books), 1974, 110 pp.

The book focuses on various community and individual uses of small scale alternative energy.

Whole Earth Truck Store \$3.95
558 Santa Cruz Ave.
Menlo Park, CA 94025

TREATISE ON MILLS AND MILLWORK

Fairbairn, W., (Longmans, London), 1861, _____pp.

This publication discusses watermills in detail and is available through your local library.

Longmans (Dorchester) Price subject to change.
Friary Press Ltd.
Dorchester, Dorset
England

VILLAGE WATER SUPPLY: ECONOMICS AND POLICY IN THE DEVELOPING WORLD

Saunders, R.J. and Warford, J.J., (John Hopkins University Press), 1976, 279 pp.

A discussion of the socio-economic and administrative problems associated with rural area water supply and sanitation.

World Bank Paperback \$6.00
1818 H. St., N.W. Hardback \$17.50
Washington, D.C. 20433

VILLAGE TECHNOLOGY HANDBOOK

VITA, (VITA), 1970, pp. 1-145.

Chapter 1, Water Resources, encompasses developing water resources, water lifting and transport, water storage and power to water purification.

VITA \$9.00
3706 Rhode Island Ave.
Mt. Rainier, MD 20822

WATER POWER DEVELOPMENT - VOL. 1

Mosonyi, E., (VDR, Verlag), 1960, _____pp.

Volume 1 of this two section text, Low-Head Water Plants, includes a section on "Midget Power Plants."

Hungarian Academy of Sciences
Budapest, Hungary

WATER SUPPLY FOR RURAL AREAS AND SMALL COMMUNITIES

Wagner, E. and Lanoix, J., (World Health Organization), 1971, 327 pp.

A book that informs a small community how to plan and manage a water supply system with sanitation considerations.

Whole Earth Truck Store \$17.60
558 Santa Cruz Ave.
Menlo Park, CA 94025

WATER SUPPLY ENGINEERING

Babbitt, H.E., and Doland, J.J., (McGraw-Hill), 1949, 637 pp.

A general hydrologic and civil engineering text.

McGraw-Hill \$2.00
New York, NY 10016

THE WHOLE MOTHER EARTH WATER WORKS

c/o Edward Barberie
PO Box 104
Green Springs, WV 26722

WINDMILLS AND WATERMILLS

Reynolds, J., (Praeger Publishers), 1970, 191 pp.

This book examines overshot, undershot, breastshot, floating, tide and vertical-axis water wheels. Numerous applications such as grain grinding, water lifting, pumping, etc. are presented.

Whole Earth Truck Store \$8.95
558 Santa Cruz Ave.
Menlo Park, CA 94025

YOUNG MILL-WRIGHT AND MILLER'S GUIDE

Evans, O., (Technology and Society Services, 1870), reprinted 1972, 400 pp.

A classic book written in 1870 that is oriented toward the use of water wheels for such things as grinding and equipment operation. Different types of wheels are discussed, as well as mechanism and construction.

Metastasis \$21.00
PO Box 128
Marblemount WA 98267

II. PERIODICALS, PAMPHLETS, BOOKLETS AND CIRCULARSB.Y.S. CROSS-FLOW TURBINES

Adam, C., (N.I.D.C. and S.A.T.A.), 1974, 51 pp.

A technical paper illustrating how to construct cross-flow turbines in the 10 to 40 kw range.

Clemens Adams \$10.00
9320 Arbon
Switzerland

ELECTRICITY FOR THE FARM

Anderson, F., (Macmillan Co.), 1915, _____ pp.

A good, general article for those who want to produce inexpensive power via the water wheel with a DC generator.

A WOODEN OVERSHOT WHEEL

Bass, G., In Cloudburst-A Handbook of Rural Skills and Technology, Marks, V. (ed), (Cloudburst Press), 1977, pp. 64-68.

Cloudburst Press
85 S. Washington St.
Seattle, WA 98104

BUILDING ON OVERSHOT WHEEL

Bassett, C.D., (Reprint in Mother Earth News), March, 1972, pp. 28-31.

Mother Earth News
PO Box 70
Hendersonville, NC 28739

DAMS TURN WATER INTO KILOWATTS

Bassett, C.D., (Popular Science), June, 1947, pp. 202-203.

LOW-COST DEVELOPMENT OF SMALL WATER POWER SITES

Hamm, H.W., (VITA), 1975, 43 pp.

This booklet provides guidelines for assessing individual power needs and available power potential, as well as, plant location, selection, construction and installation. A detailed set of instructions is included for constructing a Michell type reaction turbine.

VITA \$2.00
3706 Rhode Island Ave.
Mt. Rainier, MD 20822

POWER DEVELOPMENT OF SMALL STREAMS

Harris and Rice, (Rodney Hunt Machine Co.), 1920, _____pp.

Rodney Hunt Machine Co.
Orange, MA 01364

HINTS ON THE DEVELOPMENT OF SMALL WATER-POWER-LEFFEL PAMPHLET "A"

James Leffel and Co., (James Leffel and Co.), _____, 8pp.

A pamphlet that presents the information necessary for people to assess their streams' energy potential.

The James Leffel and Co. Free
426 East St.
Springfield, OH 45501

HYDROELECTRIC POWER FROM A HOPPE'S HYDROELECTRIC UNIT-BULLETIN H-49

James Leffel and Co., (James Leffel and Co.), _____, _____pp.

The James Leffel and Co.
426 East St.
Springfield, OH 45501

TURBINE WATER WHEELS-BULLETIN 36

James Leffel and Co., (James Leffel and Co.), _____, _____pp.

The James Leffel and Co.
426 East St.
Springfield, OH 45501

HYDRAULIC RAM FORCES WATER TO PUMP ITSELF

Kaufman, A.W., (Popular Science Monthly), October, 1948, pp. 231-233.

A HYDRAULIC RAM FOR VILLAGE USE

Kindel, E.W., (VITA), 1970, 15 pp.

This pamphlet provides a clear understanding of ram mechanism, construction, installation, adjustment and design.

VITA Publications Service \$1.00
3706 Rhode Island Ave.
Mt. Rainier, MD 20822

CONSTRUCTION OF MILL DAMS

Leffel, J., (History of Technology Ser., Vol. 1), 1972, _____pp.

Reprinted from the 1881 edition.

The James Leffel Company \$12.00
426 East St.
Springfield, OH 45501

HAND-MADE HYDRO POWER

Langhorne, H.F., (A.S.E., No. 28), October, 1977, pp. 7-11.

MICRO-HYDRO: CIVIL ENGINEERING ASPECTS

Mansell, D., Atkins, G. and Kiek, S., (PNG Univ. of Technology), _____, 11 pp.

This article identifies problems encountered in developing small scale water power for the engineer and layman. Problems include:

low water flow calculations, construction of channels and flumes, and soil instabilities associated with earth dam construction.

Don Manseil
Civil Engineering Dept.
PNG Univ. of Technology
Box 793, Lae
Papua, New Guinea

HYDRAULIC RAMS

Marier, D., (Alternative Sources of Energy, No. 1), _____, _____pp.

This article presents a general and interesting discussion of the topic.

MEASURING WATER FLOW

Marier, D., (A.S.E., No. 1), July, 1971, pp. 8-10.

A.S.E.
Rt. 2, Box 90A
Milaca, MN 56353

THE MICHELL TURBINE

Marks, V., (ed) In Cloudburst-A Handbook of Rural Skills and Technology, (Cloudburst Press), 1977, pp. 64-68.

Cloudburst Press
85 S. Washington St.
Seattle, WA 98104

WATER WHEEL DESIGN

Marks, V., (ed) In Cloudburst-A Handbook of Rural Skills and Technology, (Cloudburst Press), 1977, pp. 57-61.

Cloudburst Press
85 S. Washington St.
Seattle, WA 98104

A DO-IT YOURSELF, AXIAL-FLOW, LOW-HEAD TURBINE

Meinikheim, F., (A.S.E., No. 28), October, 1977, pp. 4-6.

A.S.E.
Rt. 2, Box 90A
Milaca, MN 56353

A WORKING PELTON WHEEL

Meinikheim, F., (A.S.E., No. 28), October, 1977, pp. 12-15.

A.S.E.
Rt. 2, Box 90A
Milaca, MN 56353

FREE HEAT TURNS WONDER WHEEL

Miller, H.L., (A.S.E., No. 28), October, 1977, pp. 16-17.

Miller generates power from the Minto Wheel by creating a small solar temperature gradient that in turn drives the wheel.

A.S.E.
Rt. 2, Box 90A
Milaca, MN 56353

THE BANKI WATER TURBINE-BULLETIN SERIES NO. 25.

Mockmore, C.A. and Merryfield, F., (Oregon State College Experimental Station), 1949, 27 pp.

This publication discusses the theory of the Banki turbine and provides instructions for the construction of a cross-flow runner.

Bulletin Series No. 25, 1949 \$.50
School of Engineering
Oregon State University
219 Covell Hall
Corvallis, OR 97331

WATER POWER

Oates, T., (The Mother Earth News, No. 24), 1973, pp. 62-64.

This article describes how Oates installed and generated his own hydroelectric power with a sluice and water wheel system.

The Mother Earth News
PO Box 70
Hendersonville, NC 28739

A DESIGN MANUAL FOR WATER WHEELS

Ovens, W.G., (VITA), 1975, 71 pp.

This booklet outlines the selection and design of a water wheel based on specific needs. Applications are discussed at length toward the end of the booklet. An excellent water wheel reference list is disclosed in the bibliography.

VITA Publication Services \$4.00
3706 Rhode Island Ave.
Mt. Rainier, MD 20822

PONDS FOR WATER SUPPLY AND RECREATION; AGRICULTURE HANDBOOK NO. 387.

Soil Conservation Service, (U.S. Dept. of Agriculture), _____, 55 pp.

This handbook supplies any interested party with basic information required to build your own earth-fill dam from assessing water needs to construction technique.

Superintendent of Documents \$1.25
U.S. Government Printing Office
Washington, D.C. 20402

HAND PUMPS FOR VILLAGE WELLS

Spangler, C., (VITA), 1975, 14 pp.

This pamphlet outlines simple, but clear design arrangements for the piston and diaphragm hand pumps.

VITA \$1.50
3706 Rhode Island Ave.
Mt. Rainier, MD 20822

CENTRIFUGAL PUMPS, TURBINES AND PROPELLERS

Spannhake, W., (M.I.T. Press), 1934, _____pp.

A highly technical article.

M.I.T. Press
Cambridge, MA 02142

ELECTRIC POWER FROM SMALL STREAMS

Technical Service Bureau, Inc., Technical Bulletin, (_____), _____, _____pp.

VITA
3706 Rhode Island Ave.
Mt. Rainier, MD 20822

U.S.D.A. WATER SUPPLY SOURCES FOR THE FARMSTEAD AND RURAL HOME FARMERS-BULLETIN NO. 2237

U.S.D.A., (U.S.D.A.), 1975, _____pp.

U.S.D.A.
Washington, D.C. 20250

1 KW RIVER GENERATOR

VITA, (VITA), _____, _____pp.

A booklet in Village Technology Plans.

VITA \$.50
3706 Rhode Island Ave.
Mt. Rainier, MD 20822

USING WATER RESOURCES

VITA, (VITA), 1977, 143 pp.

This booklet is an excerpt from the Village Technology Handbook that deals specifically with water resource development, water lifting and transport, storage, power generation and, finally, purification.

VITA
3706 Rhode Island Ave.
Mt. Rainier, MD 20822

WATER TURBINES

Wilson, P.M., (H.M.S.O.), 1974, _____pp.

An introductory booklet.

A MANUAL ON THE HYDRAULIC RAM PUMP

Watt, S.B., (Intermediate Technology Development Group), 1974, 37 pp.

This booklet illustrates how to design and construct a ram pump, how to choose a location site and how to install, adjust and maintain parts.

International Scholarly Book Services \$3.00
PO Box 555
Forest Grove, OR 97116

FARM WATER POWER

Warren, G., (U.S. Department of Agriculture), 1931, _____pp.

U.S. Government Printing Office
Washington, D.C. 20403

THE OWNER-BUILT HYDROELECTRIC PLANT

_____, In Access Catalog, Vol. 1, No. 7, pp. 12-15.

WATER POWER

_____, (A.S.E., No. 14), 1974, pp. 17-21.

This article is reprinted from Hydraulic Engineering, 1899, and contains plenty of information for the construction of water wheels.

A.S.E. \$1.50
Rt. 2, Box 90A
Milaca, MN 56353

WATER POWER FOR YOUR HOME

_____, (Popular Science), May, 1977, _____pp.

III. MANUFACTURERS

A. Hydraulic Rams and Pumps

Akins Manufacturing
312 N. Hightower St.
Thomaston, GA 30286 (404) 647-8941

This company introduces the Foster Hydraulic Ram that will pump water from a flowing stream up to 300 feet above itself without the use of outside power.

* * * * *

Chu Backi Goshi Kaisha (CECOCO)
PO Box 8
Ibaraki City
Osaka, Japan

This company produces hydraulic rams ranging in capacity from 25 to 100 litres/minute that operate with a minimum of .5 meters of water head.

* * * * *

Green and Carter
Vulcan Iron Works
Kingsworthy
Winchester, Hampshire
England

This company manufactures "Vulcan" hydraulic rams.

* * * * *

Grundfos Pumps Corporation
2555 Clovis Ave.
Clovis, CA 93612

This corporation deals in low energy water pumps.

* * * * *

John Blake, Ltd.
Box 43, Royal Works
Accrington, Lancashire BB5 5LP
England

The John Blake, Ltd. company manufactures nine models of the "Hydram" hydraulic ram that will pump water to heights of several feet from a head of 3.5 feet at 1.5 to 40 gallons/minute. If the reader sends information concerning his specific needs to the company, a quotation will be sent back in response.

* * * * *

O'Brouk Windmill Sales
Rt. 1, 12th St.
North Benton, OH 44449 (216) 584-4681

This company distributes "Davey" hydraulic rams that will pump water to an elevation 5 to 10 times the supply head at a rate of 3 to 14 gallons/minute. Costs range from \$200 to \$300.

* * * * *

Rife Hydraulic Engine Mfg. Co.
Box 367
Millburn, NJ 07041

This company manufactures three types of rams ranging between \$300 to \$3,000 in cost. Write them and they will supply you with a manual of information for \$.50.

* * * * *

Small Hydraulic Engines
PO Box 1
Greenspring, WV 26722

This company provides the design specifications for the "Greenspring" High Capacity Design Barberie Hydraulic Ram Water Pump. Information also includes instructions for proper installation and operation.

* * * * *

Waterwonder Ram Pumps
D&P Mfg.
Box 97A
Forest City, NC 28043

This company advertises that Waterwonder Ram pumps 5000 gpd without electricity from a spring, creek or lake. An information leaflet is available for \$1.00.

* * * * *

B. Turbines

AB Bofors-Nohab
S-46101 Trollhattan
Sweden

This company offers access to hydraulic turbines and related equipment as well as technical solutions, economic information and advice for project implementation concerning hydro-power generation.

* * * * *

Balaju Yantra Shala (P) Ltd.
Balaju
Katmandu, Nepal

BYS manufactures 9 different small cross-flow turbines that are used primarily for driving machines in Nepal. Send one dollar for further details.

* * * * *

Barber Hydraulic Turbines Ltd.
Barber Point
PO Box 340
Point Colborne, Ontario
Canada L3K 5W1

Barber investigates and plans small hydro power sites, designs dams and is currently developing a "Mini-Hydro" unit to output 20 kw.

* * * * *

Bell Hydroelectric
3 Leatherstocking St.
Cooperstown, NY 13326 (607) 547-5260

James Bell manufactures a variety of cross-flow turbines individually or to order with outputs from 2 kw. He supplies a cost estimate for a given site and turbine details for \$2.00.

* * * * *

C. Dumont and Cie
Pont de Ste. Uze 26240
St. Vallier
Drome, France

Dumont and Cie manufacture Francis, Pelton and Kaplan turbines with access to related equipment.

* * * * *

Canyon Industries
5346 Mosquito Lake Rd.
Deming, WA 98244

Canyon produces "Hydromite", a miniturbine that outputs 150 to 700 watts with a flow of 30 to 40 cfm and a head of 15 to 34 feet. Send \$1.00 to Canyon for further details.

* * * * *

Cumberland General Store
Rt. 3, Box 479
Crossville, TN 38555

Cumberland is a distributor for the Leffel Hoppes unit.

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Escher Wyss Limited
CH-8023 Zurich
Switzerland

This company just recently started manufacturing "Mini-Straflo" turbines that output from 400 kw.

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GSA Associates
223 Katonah Ave.
Katonah, NY 10536 (914) 232-8165

Grover designed, manufactures and installs a new version of the Francis turbine as well as Kaplan turbines that output 3 to 25 kw. For more information, send \$1.00.

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Gilbert Gilkes and Gordon Ltd.
Kendal
Westmorland, England

This group distributes the "Hydec" impulse turbine as well as a variety of Francis and Pelton turbines to order.

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Intermediate Technology Development Group Limited
9 King St.
London WC2E 8HN
England

This company distributes propeller turbines and Pelton Wheels with an output range from 5 to 50 kw.

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The James Leffel and Co.
426 East St.
Springfield, OH 45501

Leffel has manufactured water power equipment for 110 years. Presently they manufacture turbines and "The Hoppes Unit" (a small hydro unit) as well as engineer or consult any size water power installation.

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Judd Distributing Co.
8600 Lake City Way, N.W.
Seattle, WA 98115

Judd distributes water turbines with an output of up to 3 kw and range in price from \$400 to \$1,000.

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Jyoti Ltd.
R.C. Dutt Rd.
Baroda - 390 005, India

Jyoti manufactures a variety of "Micro-Hydel" turbine sets with outputs from 25 to 1000 kw.

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K.G.W.
Fack, S681 01
Kristinehamn, Sweden

This company sells various propeller type turbines with outputs from 100 kw.

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Natural Power Inc.
New Boston, NH 03070 (603) 487-2456

This group manufactures electric alternator governors.

* * * * *

Niagara Water Wheels, Ltd.
Box 326
Bridge Station
Niagara Falls, NY 14305 (416) 744-7418

This company deals with the design, manufacturing and installation of small to medium sized water power units. Their service includes production of new or rebuilt turbines.

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Northeast Hydro Co., Inc.
Main Office, Box 127
Clement Rd.
Hudson, NH 03051 (603) 883-0020

This company will service repair and install small or large scale hydropower units. They have a Turbine Division and an underwater dam repair division known as "The Dam Divers".

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Officine Buehler
Taverne
Canton Ticino
Switzerland

This company manufactures a variety of small water turbines and governors.

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Ossenberger-Turbinen fabrik
F.W.E. Stapenhorst
285 Labrosse Ave.
Point Claire, Quebec
H9R 1A3 Canada (514) 695-2044

Stapenhorst is the North American representative for Ossenberger turbines which manufacture the Michell, (Banki) cross-flow turbine primarily suited for a small community's use. Information is supplied freely upon request from Ossenberger-Turbinen fabrik, D-8832 Weissenberg i. Bay, PO Box 425, Bayern, Germany or their Canadian representative.

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Speedright Equipment Ltd.
PO Box 169
Levin, New Zealand

This group manufacturers a small turbine set.

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Woodward Governor Company
5001 N. 2nd St.
Rockford, IL 61101

This company manufactures mechanical governors.

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C. Water wheels

Alaska Wind and Water Power
PO Box G
Chugiak, AK 99567 (907) 688-2896

Francis Soltis' company offers engineering assistance and installation of a complete range of manufactured Pelton wheels and turbines. Send \$2.00 for his brochure.

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Canyon Industries
PO Box 2543
Bellingham, WA 98225

This group produces a propellor type water wheel that generates 12 volt D.C. power.

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Elektro G.m.B.H.
St. Gallerstrasse 27
Winterthur, Switzerland

Elektro manufactures a wide range of Pelton wheels as well as a small Francis turbine that is higher in price than the average U.S. model, but of higher quality. They have no U.S. distributors.

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Independent Power Developers, Inc.
Sandpoint, ID 59853 (208) 263-2166

Bill Delp installs complete independent power units any place and also consults. His company manufactures a small Pelton wheel and a packaged, complete system. An information packet is available for \$2.00 upon request.

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Land and Leisure (Services) Ltd.
Priory Lane
St. Thomas, Launceston
Cornwall, England

Land and Leisure sells both Pelton wheels and propeller-type turbines as complete units or the runner by itself.

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Meinikheim Machines
PO Box 5
Banks, ID 63602 (208) 793-2555

Felix Meinikheim custom makes Pelton wheel hydroelectric plants and electronic governors for the same. He also consults on hydro plant design and will make parts on order.

National Center for Alternative Technology
Machynlleth, Powys, Wales

This group sells design plans for a 10 ft. diameter wooden water wheel for \$1.00

Paul Dillow
2742 Victoria Drive
Alpine, CA 92001

Dillow sells design plans for aluminum water wheels from 4 to 8 foot diameters for \$10 each.

Pumps and Power, Ltd.
PO Box 2048
Vancouver 6, B.C., Canada

P. and P. manufactures water wheels and will accept special orders.

Pumps, Pipes and Power
Kingston Village
Austin, NV 89310 (702) 964-2483

Although concerned with irrigation practices, this group manufactures and installs Pelton wheels with an output of 15 kw operating under 450 feet of head.

Small Hydroelectric Systems and Equipment
PO Box 124
Custer, WA 98240 (206) 366-7203

William Kitching and Associates manufacture and install 3 types of Pelton wheels available as complete units, the wheels themselves or any component part. Technical sheets are available for \$5.00 per set upon request.

Westward Mouldings Limited
Greenhill Works
Delaware Rd.
Gunnislake, Cornwall
England

This group manufactures a variety of fiber glass water wheels that output a range of 3.6 to 5 kw and cost between \$1,200 to \$4,800.

IV. INDEPENDENT INSTALLATIONS

Eldrich Bowler
Snake River Pottery
Bliss, ID 83314

Bowler is self-sufficient for his trade since he installed and modified a propeller turbine.

Christopher Fried
Box 366, Rt. 1
Elysburg, PA 17824

Fried owns a nine acre farm with small pond and stream. He claims to have harnessed the stream's flow and is offering assistance to those installing their own hydro units.

Bill Daniels
Rt. 1, Box 285
Olympia, WA 98502

Daniels has generated electricity from a local spring and is using hot water for heating greenhouses, hydroponics and as a source for residual heat.

Dave Giles
Salmon River Lodge
Shoup, ID 83469

Giles operates a small Pelton wheel with a 18 kw to 25 kw generator.

Gary Skeem
(Portneuf River)
McCammon, ID 83250

Skeem utilized fifteen feet of natural head by installing a Sampson type turbine and 25,000 watt generator.

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John C. Sargent
Box 385
Duvall, WA 98019

Sargent has installed a small scale hydropower unit on his property.

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Charles A. Zimbicki
Star Rt. C, Box 289
Palmer, AK 99645

Zimbicki built a hydraulic ram pump from plumbing fittings and has designed an undershot water wheel for a small stream.

V. CONSULTANTS, PROFESSIONALS AND VOLUNTEERS OFFERING HELP

Vincent Allen Associates
291 High Street
Epping, Essex
England

This group offers consulting services for the development of small hydro power.

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Patrick G. Crandall
1938 S. Plumer
Tucson, AZ 85713

Crandall planned to incorporate batteries in the use of turbines and water wheels.

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George S. Erskine
Box 3060
Eureka, CA 95501

Erskine's expertise is retrofitting existing non-generating dams for hydroelectric power generation.

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Dan Howell
Wind-Sun Energy Store
423 Avenue A
Horsham, PA 19044

Howell has completed a small water power experiment in New Jersey.

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Guy Immega
Lasqueti Island
British Columbia, Canada

Immega is a professional in the small hydro power field and offers his services as a consultant.

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Elmer Jorgensen
1302 East N. Grand St.
Springfield, IL 62701

Jorgensen claims to have a new design for hydro power generation.

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Fluid Energy Systems, Inc.
2903 Ocean Park Blvd.
Santa Monica, CA 90405 (213) 882-5062

F.E.S., Inc. is a multidisciplinary consulting firm providing engineering, managerial, financial planning and administrative consulting service to clients concerned with energy resource development and recovery.

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Kent D. Kieswelter
44226 S.E. 78th St.
Snoqualmie, WA 98065

Kieswelter advertised his idea for a totally submerged generator in Alternative Sources of Energy, August, 1977, (No. 27).

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Low Impact Technology
34 Martin St.
South Melbourne
Victoria, Australia

L.I.T. deals in the alternative energy field as a consultant, distributor and installation firm.

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Bruce R. Montgomery
Rt. 1, Box 2821
Belleview, FL 32620

Montgomery completed two science projects related to water power--
both designs have advanced to state level.

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Richard Olson
RD 6, Box 42
Morgantown, WV 26505

Olson has experimented with adaptations of water wheels and turbines.

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Eric Strattsma, Manager
Aero-Sun and Water Power, Co.
Box 1269
Ashland, OR 97520

Strattsma may be a valuable source for new ideas.

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Glenn Twombly
17975 Willow Creek Rd.
Occidental, CA 95465

Twombly advertises himself as an "alternative technology consultant"
and is interested in the cross-application of various technologies
to create new systems.

VI. ADDITIONAL INFORMATION SOURCES

AERO
417 Stapleton Bldg.
Billings, MT 59101

A newsletter presenting information on old windmills, fifty-five
gallon drums, plumbing and various other topics.

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Alternative Consumer Energy Society
4800 Oak Grove Dr.
Pasadena, CA 91103

A guide and access to alternative energy technology, including
low-cost materials and hardware, technical consulting and educa-
tional facilities.

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Alternative Energy Directory
AEPCO, PO Box 26507
Albuquerque, NM 87125

A reference pamphlet for the location of booklets, catalogs,
publications and hardware suppliers all related to the energy
field.

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A.S.E.
Rt. 2
Box 90A
Milaca, MN 56353

A quarterly magazine that emphasizes alternative technologies
for scientists, experimenters and energy conscious societies.

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AN ALTERNATIVE TECHNOLOGY EQUIPMENT DIRECTORY

Eccli, E., (_____), 1975, _____pp.

John Roby
3703 Nassau Drive
San Diego, CA 92115

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Appropriate Technology
Intermediate Technology Development Group
9 King St.
Covent Garden
London WC2E 8HN
England

A quarterly journal that presents problems, ideas and solutions
concerning intermediate technology in developing countries.

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A BIBLIOGRAPHY OF LOW-COST WATER TECHNOLOGIES

Bateman, G., (Intermediate Technology Development Group), 1974,
39 pp.

An annotated bibliography listing references for water sources,
its access, storage, transportation and treatment.

International Scholarly Book Service \$3.00
PO Box 555
Forest Grove, OR 97116

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The Center for Environmental Research
School of Architecture and Applied Arts
University of Oregon
Eugene, OR 97403
Attn: Steve Baker / John Reynolds

A research center developing new energy technologies while testing and evaluating existing ones.

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COMING AROUND--SOURCE LIST OF APPROPRIATE TECHNOLOGY

L. deMoll, (RAIN), _____, _____pp.

RAIN \$1.00
2270 NW Irving St.
Portland, OR 97210

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A DESIGN MANUAL FOR WATER WHEELS

Ovens, W.G., (VITA), 1975, 71 pp.

The bibliography for this booklet contains references for water wheel design, construction, use, history and materials required for home assembly. Available for a small fee.

VITA
3706 Rhode Island Ave.
Mt. Rainier, MD 20822

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ECO-TECH, THE WHOLE EARTHER'S GUIDE TO THE ALTERNATIVE SOCIETY

de Ropp, S., (Dell Publishing Co.), 1975, _____pp.

Dell Publishing Co.
New York, NY 10017

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Edmund Scientific Co.
605 Edscorp Bldg.
Barrington, NJ 08007

Edmund Scientific is a resource for numerous books and various materials on alternative energy.

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ELECTRIC POWER PLANT INTERNATIONAL

A yearly publication that lists the addresses of alternator and inverter manufacturers worldwide. This may be available at your local library.

Electric Power Plant International
Cleve Road
Leatherhead
Surry, England

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Energy Probe
43 Queen's Park Crescent East
Toronto, Ontario (416) 978-7014
Canada

E.P. has a good energy information library and provides contacts.

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THE ENERGY INDEX: A SELECT GUIDE TO ENERGY INFORMATION SINCE 1970

Environmental Information Center, Inc., (_____), _____, _____pp.

Energy Reference Dept.
124 E. 39th St.
New York, NY 10016

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ENERGY INFORMATION LOCATOR: 05

This 187 page book will help anyone locate directories, newsletters, journals, energy centers, information centers and publishers involved in the energy field.

Environment Information Center, Inc.
Energy Reference Dept.
124 E. 39th St.
New York, NY 10016

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ENERGY: WHO'S DOING WHAT?

This free booklet contains a list of U.S. citizen groups, companies and non-profit organizations involved in the energy field.

Park Project on Energy Interpretation
National Recreation and Park Assoc.
1601 N. Kent St.
Arlington, VA 22209

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Exploring Energy Choices \$.75
Energy Policy Project Ford Foundation
PO Box 23212
Washington, D.C.

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Intermediate Technology Development, Ltd.
9 King St.
London, WCZ 8HN
England

E.F. Schumaker's appropriate technology group.
* * * * *

RAIN
2270 NW Irving
Portland, OR 97210

"A directory of Environmental Information Research in the
Pacific Northwest." - RAIN
* * * * *

SPECTRUM: AN ALTERNATIVE TECHNOLOGY EQUIPMENT DIRECTORY

Eccli, E. (ed), (A.S.E.), _____, 64 pp.

A.S.E. \$2.00
Rt. 2
Box 90A
Milaca, MN 56353
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TAICH News
Technical Assistance Information
Clearing House
200 Park Ave. So.
New York, NY 10003

A 4 page newsletter published 5 to 6 times a year providing
information on worldwide agencies working on technical assis-
tance and appropriate technology in developing countries.
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Total Environmental Action
Box 47
Harrisville, NH 03450
Attn: Bruce Anderson

This source provides information on current energy and en-
vironmental publications or workshops.
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Tree Farm Energy, Inc.
RD #3
Slippery Rock, PA 16057

A non-profit energy group that supplies various information con-
cerning small hydro power systems.
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United Nations Environmental Programme
PO Box 30552
Nairobi, Kenya

This publication presents many nations' problems and solutions to
earth and water resource use.
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U.S. Water Resources Council
2120 L. St., NW
Washington, D.C. 20037

The official water study group that publishes volumes of material
each year concerned with ongoing research and current problems in
the water field.
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Volunteers in Technical Assistance
3706 Rhode Island Ave.
Mt. Rainier, MD 20822

The title and numerous lists of worldwide publications speak for
themselves.
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NOTES

IDAHO WATER RESOURCES RESEARCH INSTITUTE

Located on the U of I campus, the Institute administers and coordinates statewide and regional programs of multidisciplinary research in water and related land resources. Studies are performed by university researchers for public and private organizations. Among the areas of research in which the Institute seeks to make contributions are:



WATER AND PEOPLE

Social and economic aspects of development, preservation, recreation, health, municipal needs, wild and scenic rivers.



WATER AND AGRICULTURE

Irrigation, fish farming, soil conservation, groundwater, evapotranspiration, runoff.



WATER AND ENVIRONMENT

Fish and wildlife, watershed management, water quality control, erosion and sedimentation, flooding, aesthetics.



WATER AND ENERGY

Hydroelectric power, cooling water requirements and uses, alternate energy sources, siting criteria.



WATER AND PUBLIC POLICY

Water law, resource planning and management, water rights, public involvement, public institutions.

FOR MORE INFORMATION

please contact:

Director
Idaho Water Resources Research Institute
University of Idaho
Moscow, Idaho 83843
(208) 885-6429



Idaho Water Resources Research Institute

